SHAKUNTALA KRISHNA INSTITUTE OF TECHNOLOGY KANPUR DEHAT

PRACTICAL FILE

Computer Laboratory and Practical Work of

Java Programming & Dynamic Webpage Design

BCA-5002P

2026-2027

Student Name	**Class**
Roll Number	**Submitted To**

Date:

SHAKUNTALA KRISHNA INSTITUTE OF TECHNOLOGY

KANPUR DEHAT, UTTAR PRADESH

BACHELOR OF COMPUTER APPLICATIONS (BCA)

CERTIFICATE

This is to certify that Mr./Ms. _____, Roll No. _____, a student of BCA _____ Year / Semester, has satisfactorily completed the practical work in the subject "Java Programming Lab" during the Academic Session 2026–2027, under my guidance and supervision.

The work submitted in this practical file is found satisfactory and is being submitted as a part of the academic requirements of the BCA programme.

_____	_____
Subject Teacher	**Head of Department**
_____	_____
External Examiner	**Principal**

Date: _____ **Place: Kanpur Dehat**

SHAKUNTALA KRISHNA INSTITUTE OF TECHNOLOGY

KANPUR DEHAT, UTTAR PRADESH

BACHELOR OF COMPUTER APPLICATIONS (BCA)

ACKNOWLEDGEMENT

I would like to express my sincere gratitude to everyone who helped and guided me in completing this Java Programming practical file.

I am thankful to the Principal and the Head of the Department of Shakuntala Krishna Institute of Technology for providing the necessary facilities and a supportive academic environment.

I express my heartfelt thanks to my subject teacher _____ for valuable guidance, continuous encouragement, and helpful suggestions throughout the practical work.

I also thank my classmates, friends, and family members for their support and cooperation. This practical work helped me strengthen my understanding of Java programming and improve my programming skills.

Finally, I take this opportunity to thank everyone who contributed, directly or indirectly, to the successful completion of this practical file.

Yours sincerely,

Name: _____

Roll No.: _____

BCA _____ Year / Semester

Program - 1

Hello World

```
class Main {
    public static void main(String[] args) {
        System.out.println("Hello, World!");
    }
}
```

Program - 2

Display Student Details

```
class Main {
    public static void main(String[] args) {
        String name = "Amit";
        int rollNo = 101;
        double marks = 85.5;
        System.out.println("Name: " + name);
        System.out.println("Roll No: " + rollNo);
        System.out.println("Marks: " + marks);
    }
}
```

Program - 3

Input Using Scanner

```
import java.util.Scanner;

class Main {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        System.out.print("Enter your name: ");
        String name = sc.nextLine();
        System.out.print("Enter your age: ");
        int age = sc.nextInt();
        System.out.println("Name = " + name);
        System.out.println("Age = " + age);
        sc.close();
    }
}
```

Program - 4

Demonstrate Primitive Data Types

```
class Main {
    public static void main(String[] args) {
        int a = 10;
        double b = 12.5;
        char c = 'J';
        boolean d = true;
        byte e = 100;
        long f = 100000L;
        float g = 5.5f;
        short h = 200;
        System.out.println(a + " " + b + " " + c + " " + d);
        System.out.println(e + " " + f + " " + g + " " + h);
    }
}
```

Program - 5

Type Casting

```
class Main {
    public static void main(String[] args) {
        int a = 25;
        double b = a;          // Widening
        double x = 19.78;
        int y = (int) x;       // Narrowing
        System.out.println("Widening result = " + b);
        System.out.println("Narrowing result = " + y);
    }
}
```

Program - 6

Arithmetic Operators

```
import java.util.Scanner;

class Main {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        System.out.print("Enter two integers: ");
        int a = sc.nextInt();
        int b = sc.nextInt();
        System.out.println("Sum = " + (a + b));
        System.out.println("Difference = " + (a - b));
        System.out.println("Product = " + (a * b));
        if (b != 0) {
            System.out.println("Quotient = " + (a / b));
            System.out.println("Remainder = " + (a % b));
        } else {
            System.out.println("Division by zero is not allowed.");
        }
        sc.close();
    }
}
```

Program - 7

Bitwise Operators

```
class Main {
    public static void main(String[] args) {
        int a = 5, b = 3;
        System.out.println("a & b = " + (a & b));
        System.out.println("a | b = " + (a | b));
        System.out.println("a ^ b = " + (a ^ b));
        System.out.println("~a = " + (~a));
        System.out.println("a << 1 = " + (a << 1));
        System.out.println("a >> 1 = " + (a >> 1));
    }
}
```

Program - 8

Simple Interest

```
import java.util.Scanner;

class Main {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        System.out.print("Enter principal, rate and time: ");
        double p = sc.nextDouble();
        double r = sc.nextDouble();
        double t = sc.nextDouble();
        double si = p * r * t / 100;
        System.out.println("Simple Interest = " + si);
        sc.close();
    }
}
```

Program - 9

Check Even or Odd

```
import java.util.Scanner;

class Main {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        int n = sc.nextInt();
        if (n % 2 == 0) System.out.println("Even number");
        else System.out.println("Odd number");
        sc.close();
    }
}
```

Program - 10

Largest of Two Numbers

```
import java.util.Scanner;

class Main {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        int a = sc.nextInt(), b = sc.nextInt();
        if (a > b) System.out.println(a + " is largest");
        else if (b > a) System.out.println(b + " is largest");
        else System.out.println("Both are equal");
        sc.close();
    }
}
```

Program - 11

Largest of Three Numbers

```
import java.util.Scanner;

class Main {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        int a = sc.nextInt(), b = sc.nextInt(), c = sc.nextInt();
        int max = a;
        if (b > max) max = b;
        if (c > max) max = c;
        System.out.println("Largest = " + max);
        sc.close();
    }
}
```

Program - 12

Check Leap Year

```
import java.util.Scanner;

class Main {
    public static void main(String[] args) {
        int year = new Scanner(System.in).nextInt();
        if (year % 400 == 0 || (year % 4 == 0 && year % 100 != 0))
            System.out.println("Leap year");
        else
            System.out.println("Not a leap year");
    }
}
```

Program - 13

Calculator Using switch-case

```
import java.util.Scanner;

class Main {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        System.out.print("Enter first number, operator, second number: ");
        double a = sc.nextDouble();
        char op = sc.next().charAt(0);
        double b = sc.nextDouble();
        switch (op) {
            case '+': System.out.println(a + b); break;
            case '-': System.out.println(a - b); break;
            case '*': System.out.println(a * b); break;
            case '/':
                if (b != 0) System.out.println(a / b);
                else System.out.println("Cannot divide by zero");
                break;
            case '%':
                if (b != 0) System.out.println(a % b);
                else System.out.println("Cannot find remainder with zero");
                break;
            default: System.out.println("Invalid operator");
        }
        sc.close();
    }
}
```

Program - 14

Print Numbers from 1 to N

```
import java.util.Scanner;

class Main {
    public static void main(String[] args) {
        int n = new Scanner(System.in).nextInt();
        for (int i = 1; i <= n; i++) System.out.print(i + " ");
    }
}
```

Program - 15

Sum of First N Natural Numbers

```
import java.util.Scanner;

class Main {
    public static void main(String[] args) {
        int n = new Scanner(System.in).nextInt();
        long sum = 0;
        for (int i = 1; i <= n; i++) sum += i;
        System.out.println("Sum = " + sum);
    }
}
```

Program - 16

Multiplication Table

```
import java.util.Scanner;

class Main {
    public static void main(String[] args) {
        int n = new Scanner(System.in).nextInt();
        for (int i = 1; i <= 10; i++)
            System.out.println(n + " x " + i + " = " + (n * i));
    }
}
```

Program - 17

Factorial of a Number

```
import java.util.Scanner;

class Main {
    public static void main(String[] args) {
        int n = new Scanner(System.in).nextInt();
        if (n < 0) {
            System.out.println("Factorial is not defined for negative numbers");
            return;
        }
        long fact = 1;
        for (int i = 2; i <= n; i++) fact *= i;
        System.out.println("Factorial = " + fact);
    }
}
```

Program - 18

Fibonacci Series

```
import java.util.Scanner;

class Main {
    public static void main(String[] args) {
        int n = new Scanner(System.in).nextInt();
        long a = 0, b = 1;
        for (int i = 0; i < n; i++) {
            System.out.print(a + " ");
            long c = a + b;
            a = b;
            b = c;
        }
    }
}
```

Program - 19

Check Prime Number

```
import java.util.Scanner;

class Main {
    public static void main(String[] args) {
        int n = new Scanner(System.in).nextInt();
        boolean prime = n >= 2;
        for (int i = 2; i <= n / i && prime; i++) {
            if (n % i == 0) prime = false;
        }
        System.out.println(prime ? "Prime" : "Not prime");
    }
}
```

Program - 20

Reverse an Integer

```
import java.util.Scanner;

class Main {
    public static void main(String[] args) {
        int n = new Scanner(System.in).nextInt();
        int sign = n < 0 ? -1 : 1;
        n = Math.abs(n);
        long rev = 0;
        while (n > 0) {
            rev = rev * 10 + n % 10;
            n /= 10;
        }
        System.out.println("Reverse = " + (rev * sign));
    }
}
```

Program - 21

Check Palindrome Number

```
import java.util.Scanner;

class Main {
    public static void main(String[] args) {
        int n = new Scanner(System.in).nextInt();
        int original = n;
        int rev = 0;
        while (n > 0) {
            rev = rev * 10 + n % 10;
            n /= 10;
        }
        System.out.println(original >= 0 && original == rev ? "Palindrome" : "Not palindrome");
    }
}
```

Program - 22

Check Armstrong Number

```
import java.util.Scanner;

class Main {
    public static void main(String[] args) {
        int n = new Scanner(System.in).nextInt();
        int original = n, temp = n, digits = String.valueOf(n).length();
        long sum = 0;
        while (temp > 0) {
            int digit = temp % 10;
            sum += (long) Math.pow(digit, digits);
            temp /= 10;
        }
        System.out.println(n >= 0 && sum == original ? "Armstrong" : "Not Armstrong");
    }
}
```

Program - 23

Sum of Digits

```
import java.util.Scanner;

class Main {
    public static void main(String[] args) {
        int n = Math.abs(new Scanner(System.in).nextInt());
        int sum = 0;
        while (n > 0) {
            sum += n % 10;
            n /= 10;
        }
        System.out.println("Sum of digits = " + sum);
    }
}
```

Program - 24

Check Perfect Number

```
import java.util.Scanner;

class Main {
    public static void main(String[] args) {
        int n = new Scanner(System.in).nextInt();
        int sum = 0;
        for (int i = 1; i <= n / 2; i++)
            if (n > 0 && n % i == 0) sum += i;
        System.out.println(n > 0 && sum == n ? "Perfect number" : "Not perfect");
    }
}
```

Program - 25

Print Star Right Triangle

```
import java.util.Scanner;

class Main {
    public static void main(String[] args) {
        int n = new Scanner(System.in).nextInt();
        for (int i = 1; i <= n; i++) {
            for (int j = 1; j <= i; j++) System.out.print("* ");
            System.out.println();
        }
    }
}
```

Program - 26

Print Inverted Star Triangle

```
import java.util.Scanner;

class Main {
    public static void main(String[] args) {
        int n = new Scanner(System.in).nextInt();
        for (int i = n; i >= 1; i--) {
            for (int j = 1; j <= i; j++) System.out.print("* ");
            System.out.println();
        }
    }
}
```

Program - 27

Print Number Triangle

```
import java.util.Scanner;

class Main {
    public static void main(String[] args) {
        int n = new Scanner(System.in).nextInt();
        for (int i = 1; i <= n; i++) {
            for (int j = 1; j <= i; j++) System.out.print(j + " ");
            System.out.println();
        }
    }
}
```

Program - 28

Floyd's Triangle

```
import java.util.Scanner;

class Main {
    public static void main(String[] args) {
        int n = new Scanner(System.in).nextInt();
        int value = 1;
        for (int i = 1; i <= n; i++) {
            for (int j = 1; j <= i; j++) System.out.print((value++) + " ");
            System.out.println();
        }
    }
}
```

Program - 29

Print Star Pyramid

```
import java.util.Scanner;

class Main {
    public static void main(String[] args) {
        int n = new Scanner(System.in).nextInt();
        for (int i = 1; i <= n; i++) {
            for (int s = 1; s <= n - i; s++) System.out.print(" ");
            for (int j = 1; j <= 2 * i - 1; j++) System.out.print("*");
            System.out.println();
        }
    }
}
```

Program - 30

Read and Display Array Elements

```
import java.util.Scanner;

class Main {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        int n = sc.nextInt();
        int[] a = new int[n];
        for (int i = 0; i < n; i++) a[i] = sc.nextInt();
        for (int value : a) System.out.print(value + " ");
        sc.close();
    }
}
```

Program - 31

Sum and Average of Array Elements

```
import java.util.Scanner;

class Main {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        int n = sc.nextInt();
        if (n <= 0) { System.out.println("Array size must be positive"); return; }
        int[] a = new int[n];
        long sum = 0;
        for (int i = 0; i < n; i++) { a[i] = sc.nextInt(); sum += a[i]; }
        System.out.println("Sum = " + sum);
        System.out.println("Average = " + (sum * 1.0 / n));
        sc.close();
    }
}
```

Program - 32

Largest and Smallest Element in Array

```
import java.util.Scanner;

class Main {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        int n = sc.nextInt();
        if (n <= 0) { System.out.println("Invalid size"); return; }
        int[] a = new int[n];
        for (int i = 0; i < n; i++) a[i] = sc.nextInt();
        int max = a[0], min = a[0];
        for (int x : a) { if (x > max) max = x; if (x < min) min = x; }
        System.out.println("Largest = " + max);
        System.out.println("Smallest = " + min);
        sc.close();
    }
}
```

Program - 33

Linear Search in an Array

```
import java.util.Scanner;

class Main {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        int n = sc.nextInt();
        int[] a = new int[n];
        for (int i = 0; i < n; i++) a[i] = sc.nextInt();
        int key = sc.nextInt(), index = -1;
        for (int i = 0; i < n; i++) {
            if (a[i] == key) { index = i; break; }
        }
        if (index >= 0) System.out.println("Found at index " + index);
        else System.out.println("Not found");
        sc.close();
    }
}
```

Program - 34

Sort Array Using Bubble Sort

```
import java.util.Scanner;

class Main {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        int n = sc.nextInt();
        int[] a = new int[n];
        for (int i = 0; i < n; i++) a[i] = sc.nextInt();
        for (int i = 0; i < n - 1; i++) {
            for (int j = 0; j < n - 1 - i; j++) {
                if (a[j] > a[j + 1]) {
                    int temp = a[j]; a[j] = a[j + 1]; a[j + 1] = temp;
                }
            }
        }
        for (int x : a) System.out.print(x + " ");
        sc.close();
    }
}
```

Program - 35

Addition of Two 2D Matrices

```
import java.util.Scanner;

class Main {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        int[][] a = new int[2][2], b = new int[2][2];
        int[][] sum = new int[2][2];
        for (int i = 0; i < 2; i++)
            for (int j = 0; j < 2; j++) a[i][j] = sc.nextInt();
        for (int i = 0; i < 2; i++)
            for (int j = 0; j < 2; j++) b[i][j] = sc.nextInt();
        for (int i = 0; i < 2; i++) {
            for (int j = 0; j < 2; j++) {
                sum[i][j] = a[i][j] + b[i][j];
                System.out.print(sum[i][j] + " ");
            }
            System.out.println();
        }
        sc.close();
    }
}
```

Program - 36

Multiplication of Two 2D Matrices

```
import java.util.Scanner;

class Main {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        int[][] a = new int[2][2], b = new int[2][2], c = new int[2][2];
        for (int i = 0; i < 2; i++)
            for (int j = 0; j < 2; j++) a[i][j] = sc.nextInt();
        for (int i = 0; i < 2; i++)
            for (int j = 0; j < 2; j++) b[i][j] = sc.nextInt();
        for (int i = 0; i < 2; i++) {
            for (int j = 0; j < 2; j++) {
                for (int k = 0; k < 2; k++) c[i][j] += a[i][k] * b[k][j];
                System.out.print(c[i][j] + " ");
            }
            System.out.println();
        }
        sc.close();
    }
}
```

Program - 37

Find String Length without length()

```
import java.util.Scanner;

class Main {
    public static void main(String[] args) {
        String s = new Scanner(System.in).nextLine();
        int count = 0;
        for (char ch : s.toCharArray()) count++;
        System.out.println("Length = " + count);
    }
}
```

Program - 38

Reverse a String

```
import java.util.Scanner;

class Main {
    public static void main(String[] args) {
        String s = new Scanner(System.in).nextLine();
        StringBuilder result = new StringBuilder(s);
        System.out.println(result.reverse());
    }
}
```

Program - 39

Check Palindrome String

```
import java.util.Scanner;

class Main {
    public static void main(String[] args) {
        String s = new Scanner(System.in).nextLine();
        String clean = s.replaceAll("\\s+", "").toLowerCase();
        String reversed = new StringBuilder(clean).reverse().toString();
        System.out.println(clean.equals(reversed) ? "Palindrome" : "Not palindrome");
    }
}
```

Program - 40

Count Vowels and Consonants in a String

```
import java.util.Scanner;

class Main {
    public static void main(String[] args) {
        String s = new Scanner(System.in).nextLine().toLowerCase();
        int vowels = 0, consonants = 0;
        for (char ch : s.toCharArray()) {
            if (ch >= 'a' && ch <= 'z') {
                if ("aeiou".indexOf(ch) >= 0) vowels++;
                else consonants++;
            }
        }
        System.out.println("Vowels = " + vowels);
        System.out.println("Consonants = " + consonants);
    }
}
```

Program - 41

Method with Parameters and Return Value

```
import java.util.Scanner;

class Main {
    static int add(int a, int b) {
        return a + b;
    }

    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        int x = sc.nextInt();
        int y = sc.nextInt();
        System.out.println("Sum = " + add(x, y));
        sc.close();
    }
}
```

Program - 42

Method Overloading

```
class Main {
    static int sum(int a, int b) { return a + b; }
    static int sum(int a, int b, int c) { return a + b + c; }
    static double sum(double a, double b) { return a + b; }

    public static void main(String[] args) {
        System.out.println(sum(2, 3));
        System.out.println(sum(2, 3, 4));
        System.out.println(sum(2.5, 3.5));
    }
}
```

Program - 43

Factorial Using Recursion

```
import java.util.Scanner;

class Main {
    static long factorial(int n) {
        if (n <= 1) return 1;
        return n * factorial(n - 1);
    }

    public static void main(String[] args) {
        int n = new Scanner(System.in).nextInt();
        if (n < 0) System.out.println("Enter a non-negative integer");
        else System.out.println("Factorial = " + factorial(n));
    }
}
```

Program - 44

Class and Object: Student

```
class Student {
    String name;
    int rollNo;

    void display() {
        System.out.println("Name = " + name);
        System.out.println("Roll No = " + rollNo);
    }
}

class Main {
    public static void main(String[] args) {
        Student s = new Student();
        s.name = "Amit";
        s.rollNo = 101;
        s.display();
    }
}
```

Program - 45

Constructor in Java

```
class Student {
    String name;
    int rollNo;

    Student(String n, int r) {
        name = n;
        rollNo = r;
    }

    void display() {
        System.out.println(name + " " + rollNo);
    }
}

class Main {
    public static void main(String[] args) {
        Student s = new Student("Amit", 101);
        s.display();
    }
}
```

Program - 46

Single Inheritance

```
class Animal {
    void eat() { System.out.println("Animal eats"); }
}

class Dog extends Animal {
    void bark() { System.out.println("Dog barks"); }
}

class Main {
    public static void main(String[] args) {
        Dog d = new Dog();
        d.eat();
        d.bark();
    }
}
```

Program - 47

Method Overriding

```
class Parent {
    void show() { System.out.println("Parent class"); }
}
class Child extends Parent {
    @Override
    void show() { System.out.println("Child class"); }
}
class Main {
    public static void main(String[] args) {
        Parent p = new Child();
        p.show();
    }
}
```

Program - 48

Interface Implementation

```
interface Printable {
    void print();
}
class Report implements Printable {
    public void print() { System.out.println("Printing report"); }
}
class Main {
    public static void main(String[] args) {
        Printable p = new Report();
        p.print();
    }
}
```

Program - 49

Exception Handling Using try-catch

```
import java.util.Scanner;

class Main {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        try {
            int a = sc.nextInt();
            int b = sc.nextInt();
            System.out.println("Result = " + (a / b));
        } catch (ArithmeticException e) {
            System.out.println("Cannot divide by zero");
        }
        sc.close();
    }
}
```

Program - 50

User-Defined Exception

```
class InvalidAgeException extends Exception {
    InvalidAgeException(String message) { super(message); }
}
class Main {
    static void verifyAge(int age) throws InvalidAgeException {
        if (age < 18) throw new InvalidAgeException("Age must be 18 or above");
        System.out.println("Eligible");
    }
    public static void main(String[] args) {
        try {
            verifyAge(16);
        } catch (InvalidAgeException e) {
            System.out.println(e.getMessage());
        }
    }
}
```